

## CLAIMS

What is claimed is:

1. A device for converting RF pulses received by a wideband impulse radio receiver into one or more baseband signals, the device comprising:

- 5 a. an RF input for receiving the RF pulses;
- b. multiple timing inputs for receiving separate timing signals;
- c. multiple converter circuits, the converter circuits each having a signal input electrically coupled in parallel to the RF input;
- d. each converter circuit having a second input electrically coupled to one  
10 of the timing inputs such that each converter circuit can receive one of the separate timing signals;
- e. each converter circuit having a baseband signal output; and
- f. the device is packaged as a single integrated circuit in which the converter circuits are arranged on a common substrate for single or concurrent  
15 operation.

2. The device of claim 1 further comprising an RF amplifier having an input coupled to the RF input and an output coupled to the signal inputs of the converter circuits.

3. The device of claim 2 further comprising a power detector circuit operatively  
20 connected to the RF amplifier, the power detector circuit responsive to the RF amplifier.

4. The device of claim 1 wherein each converter circuit includes a signal integrator that is responsive to one of the separate timing signals and that integrates the RF pulses to provide a converter output signal coupled to a corresponding one of the baseband signal outputs.

5. A wideband impulse radio receiver comprising:

- a. an antenna input for receiving time-modulated RF pulses;
- b. multiple converter circuits, each converter circuit having an RF signal input electrically connected in parallel with the RF signal inputs on the other converter circuits and to the antenna input, a timing input electrically connected to a corresponding timing signal generator, and a baseband signal output;
- c. each converter circuit operable to convert at least a portion of the RF pulses into a baseband signal at a corresponding one of the baseband signal outputs; and
- d. the converter circuits and timing signal generators are arranged on a common substrate within a single integrated circuit package such that one or more of the converter circuits can function separately or concurrently to produce separate baseband signals at the corresponding baseband signal outputs.

6. The impulse radio receiver of claim 5 further comprising a demodulator operatively connected to each of the baseband outputs.

7. The impulse radio receiver of claim 6 wherein the RF pulses are modulated by a coding component and the receiver further comprises a decode timer operatively connected to each of the converter circuits.